(Model.) 2 Sheets—Sheet 1.

S. N. SILVER.

VELOCIPEDE.

No. 267,607. Patented Nov. 14, 1882.

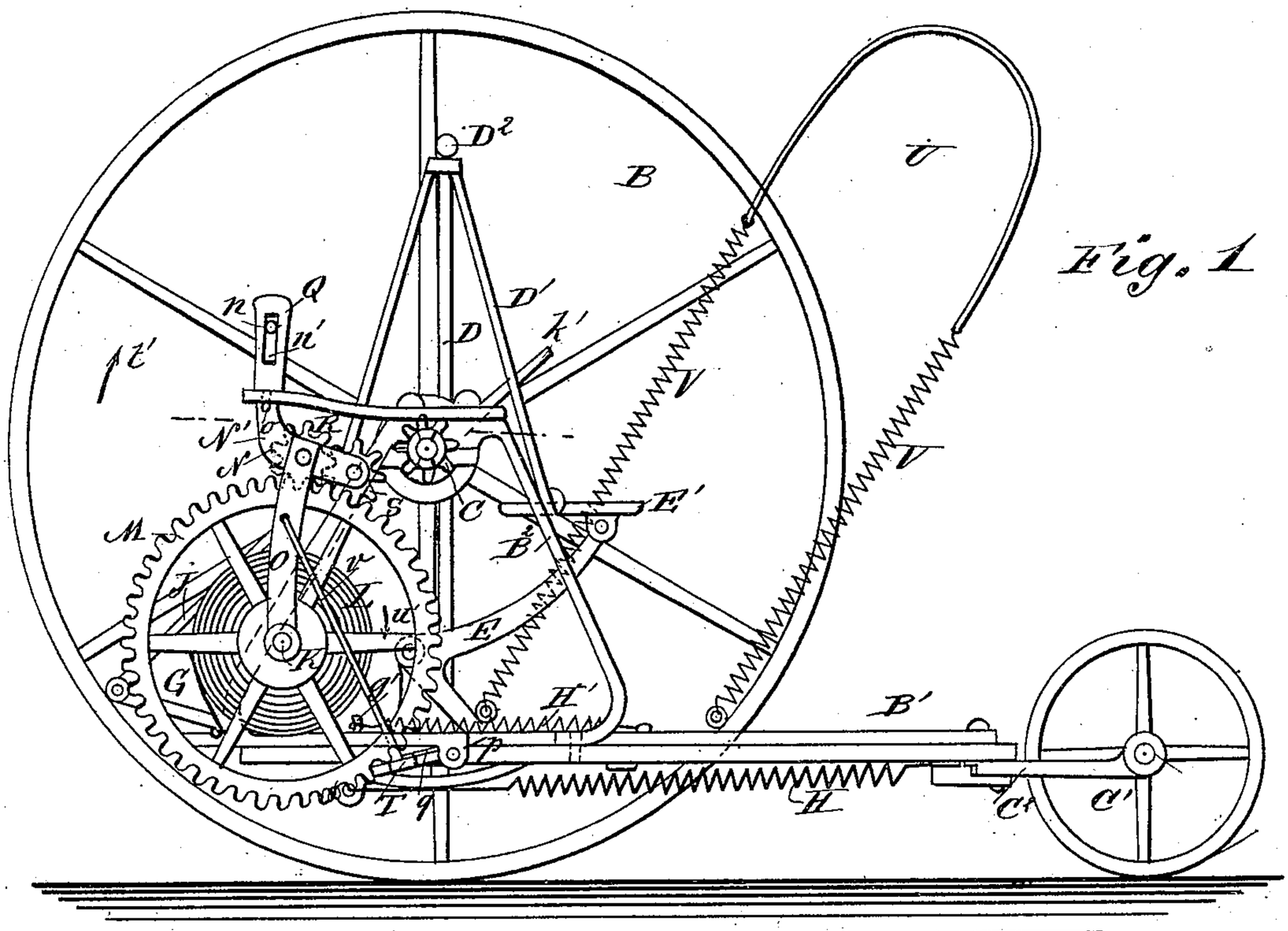

Fig. 1

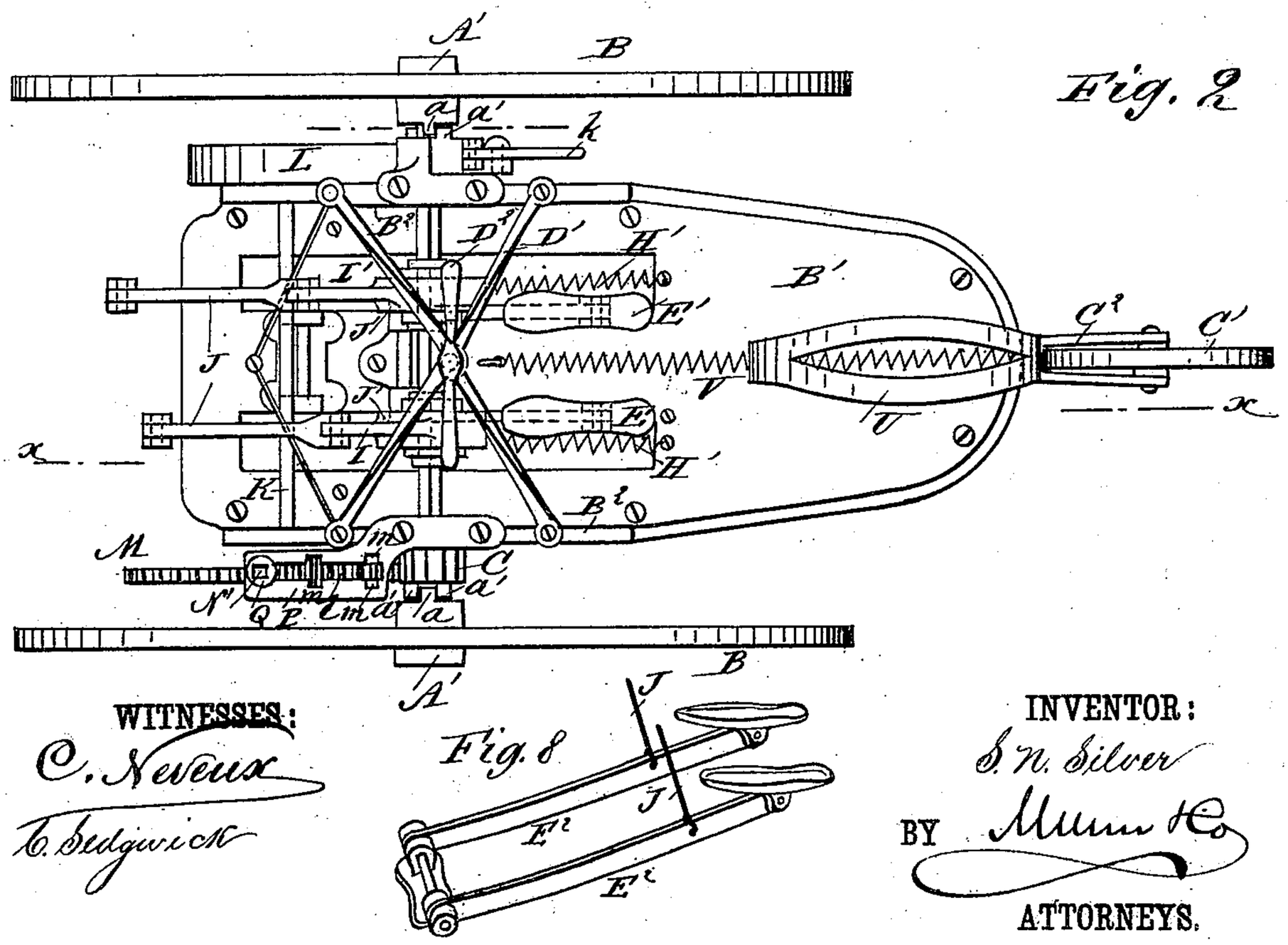

Fig. 2

Fig. 8

WITNESSES:

C. Neveux

E. Sedgwick

INVENTOR:

S. N. Silver

BY Munn & Co

ATTORNEYS.

(Model.) 2 Sheets—Sheet 2.

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Fig. 3

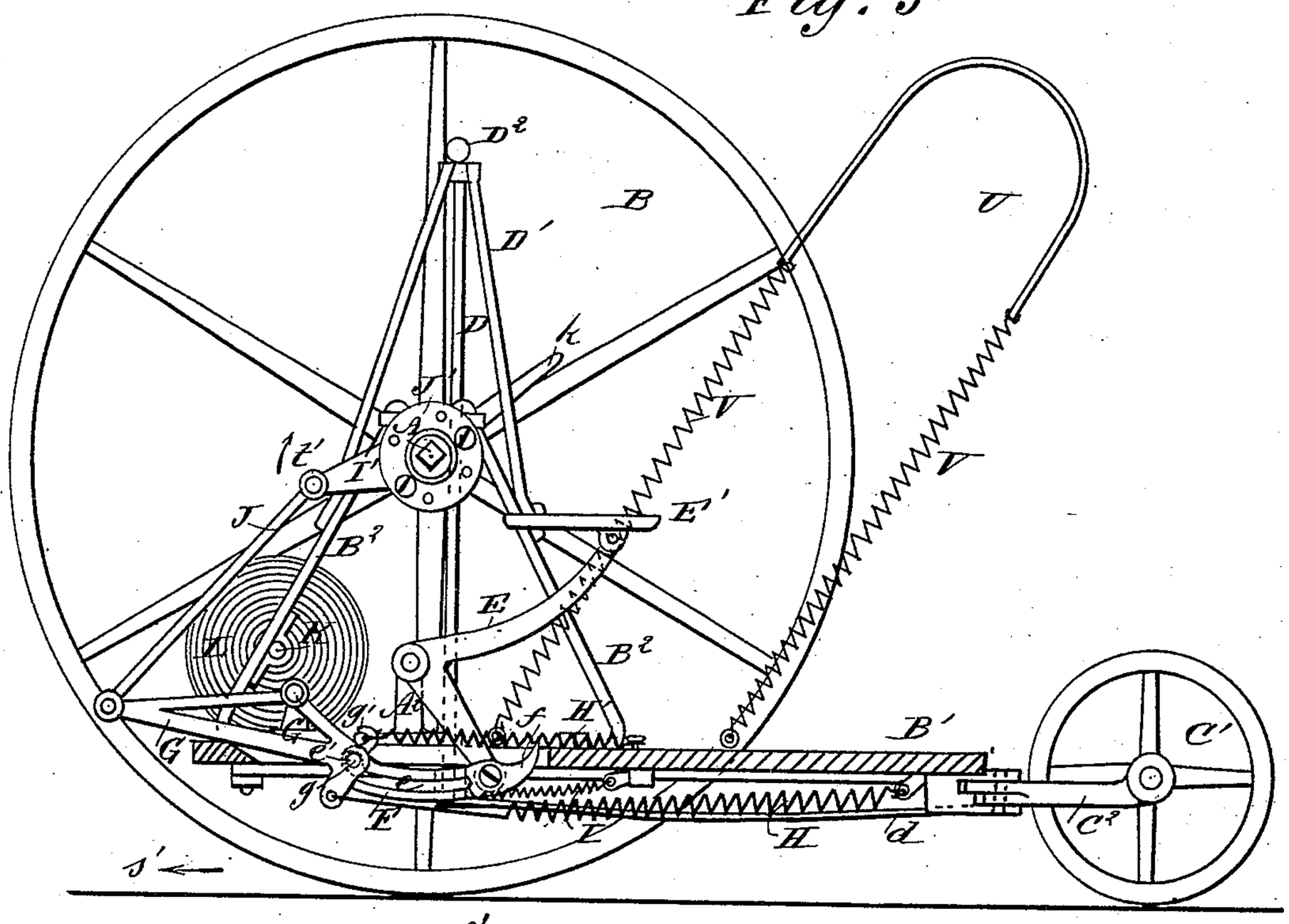


Fig. 4

Fig. 5

Fig. 6

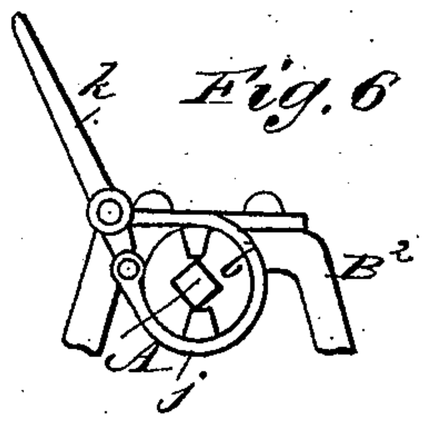
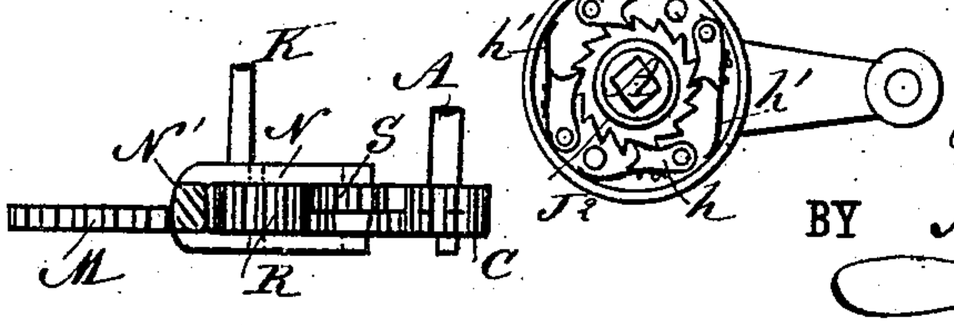


Fig. 7



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ATTORNEYS.

UNITED STATES PATENT OFFICE.

SAMUEL N. SILVER, OF AUBURN, MAINE.

VELOCIPEDE.

SPECIFICATION forming part of Letters Patent No. 267,607, dated November 14, 1882.

Application filed April 6, 1882. (Model.)

To all whom it may concern:

Be it known that I, SAMUEL N. SILVER, of Auburn, in the county of Androscoggin and State of Maine, have invented a new and Improved Velocipede, of which the following is a full, clear, and exact description.

The object of my invention is to provide a new and improved velocipede which can be propelled easily, and in which the power of the impetus of the velocipede in going down hill can be stored and utilized at the proper time.

The invention consists in a velocipede constructed with a series of clutch-boxes and ratchets on the axle, which clutch-boxes are connected by means of suitable connecting-rods with treadles or with pivoted levers connected with suitable tension-springs, which levers can be operated by means of clutch-treadles to stretch the springs, which levers are released from the treadles when the springs are stretched, upon which these springs contract and draw downward or rotate the clutch-boxes, thereby driving the vehicle forward.

The invention further consists in power-accumulating springs mounted on a shaft on the frame of the velocipede, which springs can be connected with the driving-axle in such a manner that they will be coiled when the velocipede runs down hill, and when the velocipede comes to a level or up grade these springs can be so connected with the axle as to assist in propelling the velocipede.

The invention also consists in two springs attached to the velocipede-platform and connected at the upper ends by a band or belt which the driver passes over his shoulders to increase the pressure on the treadles without increasing the load, all as will be fully described and set forth hereinafter.

Reference is to be had to the accompanying drawings, forming part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is a longitudinal elevation of my improved velocipede, showing one of the driving-wheels removed. Fig. 2 is a plan view of the same. Fig. 3 is a longitudinal sectional elevation of my improved velocipede on the line *x x*, Fig. 2. Fig. 4 is a plan view of the under side of my improved velocipede. Fig. 5 is a longitudinal elevation of one of the clutch-boxes mounted on the shaft. Fig. 6 is a longitudinal side elevation of the band-brake on the shaft. Fig. 7 is a plan view of the gearing for connecting the accumulator-spring with the shaft. Fig. 8 is a longitudinal elevation of a modified construction of the treadle.

The driving-shaft A is journaled in the hubs A′ of the driving-wheels B, which hubs are provided at the inner ends with two opposite clutch-teeth, *a*, and a collar, *b*, and a pinion, C, mounted on the ends of the shaft A, which collar and pinion are provided with clutch-teeth *a′* projecting from the outer ends thereof, which teeth *a′* are adapted to engage with the teeth *a* of the hubs A′. From this axle or shaft A the front end of the platform B′ is suspended by means of suspension-frames B^2. The rear end of the platform B′ is supported by a steering-wheel, C′, journaled in a fork, C^2, pivoted to the under side of the platform B′, and provided with an angular projection, *b′*, to which a rod, *d*, is pivoted, the other end of which is pivoted to an angular arm, *d′*, at the lower end of a vertical steering-rod, D, journaled in the platform B′ and in the top of a cross-frame, D′, secured on the supporting-frames B^2, which rod D is provided at its upper end with a transverse handle, D^2.

Below the shaft A a short standard, A^2, is secured on the platform, and to this standard two elbow-treadles or foot-levers, E, are pivoted, which are provided at the swinging ends with foot-rests E′.

To the lower end or arm of each elbow-treadle E an arm or link-piece, F, is pivoted, which is provided with a longitudinal curved slot, *e*, provided at the free end of the piece F with a recess, *e′*, extending upward from the slot *e*. At the pivoted end the slotted pivoted arm F is provided with a cam-projection, *f*, projecting beyond the end of the arm of the elbow-treadle, against which the end of this cam-projection *f* is adapted to rest, the upper end of this cam-projection *f* being widened.

Elbow or bell-crank levers G are pivoted to short standards G′ on the front end of the platform B′, which levers G are provided at the lower or rear ends with studs *g* passing through the slots *e* of the pivoted arms or link-pieces F.

Powerful spiral or other springs H are at-

tached to the front end of the under side of the platform B′ and to the lower or rear ends of the levers G, these springs passing along to the under side of the platform B′. Springs H′ are attached to the top of the platform B′ and to hooks *g′* on the lower ends of the levers G, which springs pass along the upper surface of the platform B′. Springs I are attached to the pivoted slotted arms or link-pieces F and to the platform B′.

To the front or upper ends of the levers G connecting-rods J are pivoted, which have their upper ends pivoted to arms I′ of clutch-boxes J′, loosely mounted on the shaft A, the arms I′ of these clutch-boxes projecting toward the front of the vehicle. The clutch-boxes J′ surround ratchet-wheels J^2, rigidly mounted on the shaft A, and these clutch-boxes contain a series of pivoted pawls, *h*, pressed against the ratchet-wheels J^2 by springs *h′* attached to the pawls. The collar *b* is surrounded by a brake-band, *j*, having its ends secured to a lever, *k*, pivoted to one of the frames B^2.

A shaft, K, is journaled in the front struts or bars of the frames B^2, and one or more spiral springs, L, are mounted on this shaft, which springs have one end secured to the shaft K, and the other end secured to the frame of the vehicle. A cog-wheel, M, is also rigidly mounted on one end of the shaft K. A bent forked frame, N, is attached to the upper end of a swinging arm, O, pivoted to and projecting upward from that end of the shaft A on which the cog-wheel M is mounted, the upwardly-bent front end N′ of the frame N passing through the longitudinal slot *l* in a guide-frame, P, projecting toward the front from one of the frames B^2, which guide-frame is provided with notches or recesses *m* in the sides of the slot, at the ends and middle of this guide-frame.

A sliding handle, Q, is held on the upper bent end N′ of the forked frame N by studs *n* passing through longitudinal slots *n′* in this handle. This handle Q is provided at the lower end with one or two lugs, *o*, adapted to be passed into the notches or recesses *m* in the guide-frame P. A pinion, R, of about double the width of the cog-wheel M, is pivoted in the front end of the forked frame N, and a pinion, S, engaging with the pinion R, is pivoted in the rear end of the frame. This pinion S engages with one half the thickness of the pinion R, and the wheel M engages with the other half of the thickness of this pinion R. This pinion S is not adapted to engage with the cog-wheel M, but passes to the side of the same. This pinion S is adapted to engage with the fixed pinion C on the shaft A. A pawl, T, is pivoted to a bracket, *p*, on the platform B′, and is pressed against the teeth of the wheel M by a spring, *q*. A rod, *r*, pivoted to the arm O, extends through the bracket *p*, and its lower end can be pressed down on the pawl T.

If desired, the treadles E (shown in Fig. 8) may be used, the lower ends of the rods J being pivoted to these treadles, in which case the springs H H′, the levers G, and link-pieces F can be dispensed with.

Two springs, V, are attached to the platform B′, and their upper ends are connected by a belt or band, U. If desired, a seat may be provided for the operator.

The operation is as follows: The operator stands on the platform B′ and places his feet in the foot-rests E′ and presses them down, thereby moving the lower arms of the treadles and the link-pieces F toward the front of the vehicle—that is, in the direction of the arrow *s′*. The studs *g* are in the recesses *e′* of the link-pieces F, and if the link-pieces are moved in the direction of the arrow *s′* the lower ends of levers G will be moved in a like direction, and the upper or front ends of the levers G will be swung upward, thereby turning the arms I′ and ratchet-boxes J′ in the direction of the arrow *t′*. By these movements of the treadles E the springs H H′ are stretched. When the treadles E have been completely lowered the lower shanks or arms of the treadles strike against the cam-projections *f* and turn the end of the link-pieces F upward, for if the cam projections *f* rest against the lower shanks of the treadles E they cannot turn at the joint, and necessarily the ends of the link-pieces F must be raised by further depressing the treadles. By raising the front ends of the link-pieces the studs *g* will be moved out of the recesses *e′*, and the springs H H′ will draw the lower ends of the levers G in the inverse direction of the arrow *s′* with great force, thereby drawing the upper ends of the levers G and the outer ends of the arms I′ downward, that is in the inverse direction of the arrow *t′*. The pawls *h* catch on the teeth of the ratchet-wheels J^2 and rotate the same in the inverse direction of the arrow *t′*, whereby the vehicle will be propelled forward in the direction of the arrow *s′*. The treadles E are depressed alternately, and the impetus of the vehicle carries it forward, while the treadles are being pulled upward or raised by the springs I. If the treadles are raised, the recesses *e′* of the link-pieces F automatically pass over the studs *g*, so that these studs can pass into the recesses to couple the link-pieces to the levers G. If desired, the springs H and H′ may be coupled to the levers G, or the springs H′ may be detached. If increased pressure on the treadles is required without increasing the weight, the operator passes the strap U over the shoulders. The springs V pull downward and thus increase the pressure on the treadles. As the wheels B are mounted loosely on the shaft and are only turned by the clutch-teeth, the vehicle can turn a corner without causing slipping of one wheel while turning. If desired, the treadles E^2 (shown in Fig. 8) can be used in the place of the treadles. In that case the arms I will be drawn downward by the treadles E^2 direct. If the vehicle runs down

hill, the power obtained by the impetus and weight of the vehicle must be accumulated to be used at a later period. For this purpose the handle Q is raised to draw the lugs *o* of the handle Q out of the front end recesses *m* of the guide-frame P, and the handle Q is moved to the middle of the guide-frame P and locked in this position by lowering the lugs *o* into the middle notches *m*. Thereby the pinion S is engaged with the pinion C on the shaft, and the pinion R is engaged with the cog-wheel M. The wheels B rotate in inverse direction of the arrow *t'*, and the cog-wheel M and shaft K will be rotated in the direction of the arrow *w'*, whereby the springs L will be coiled or wound on the shaft K, and the power is accumulated in the springs. The pawl locks the wheel M in position and prevents uncoiling of the springs L. When the vehicle arrives at a level again the forked frame N is brought back into its original position, as shown in Figs. 1 and 7. When the vehicle arrives at an upgrade, and the power accumulated or stored in the springs L is to be utilized, the handle Q is moved to the rear end of the frame P and is locked in this position by the lugs *o*, which are passed into the notches *m* at the rear end of the frame P. The pinion R then engages with the cog-wheel M and with the pinion C, and the rod *r* is moved downward sufficiently to press the spring-pawl T downward and release the wheel M. The springs L uncoil and turn the shaft K and the cog-wheel M in the inverse direction of the arrow *w'*. The pinion R is turned in the direction of the arrow *t'*, and the pinion C, the shaft A, and the wheels B are turned in the inverse direction of the arrow *t'*—that is, the vehicle is propelled forward by the power of the springs L in addition to the power produced by the operator.

Having thus fully described my invention, I claim as new and desire to secure by Letters Patent—

1. In a velocipede, the combination, with the driving-shaft, of clutch-boxes on this shaft, bell-crank levers pivoted on the vehicle-platform, traction-springs attached to these levers and to the platform, and of treadles for stretching these springs, substantially as herein shown and described, and for the purpose set forth.

2. In a velocipede, the combination, with the driving-shaft, of clutch-boxes on the same, bell-crank levers pivoted on the vehicle-platform, which levers are connected with the clutch-boxes, traction-springs attached to these levers and to the platforms, treadles for stretching these springs, and devices for releasing the springs when stretched, substantially as herein shown and described, and for the purpose set forth.

3. In a velocipede, the combination, with the driving-shaft, of clutch-boxes on the same, bell-crank levers pivoted on the vehicle-platform, connecting-rods for connecting them with the clutch-boxes, traction-springs attached to these levers and to the platform, treadles for stretching these springs, devices for releasing the springs when stretched, and springs for raising the treadles, substantially as herein shown and described, and for the purpose set forth.

4. In a velocipede, the combination, with the driving-shaft A, of the clutch-boxes J' on the shaft, the connecting-rods J, the levers G, provided with studs *g*, the treadles E, the longitudinally-slotted link-pieces F, pivoted to the treadles E, and provided with recesses *e'* at the ends of their slots *e*, and the springs H, attached to the levers G and to the platform B', substantially as herein shown and described, and for the purpose set forth.

5. In a velocipede, the combination, with the driving-shaft A, provided with the collar *b* and pinion C, having the clutch-teeth *a'*, of the wheels B, loosely mounted on this shaft, and provided with clutch-teeth *a* at the inner ends of the hubs, substantially as herein shown and described, and for the purpose set forth.

6. The combination, with a velocipede, of the springs V, connected by a belt, substantially as herein shown and described, and for the purpose of increasing the pressure on the treadles, substantially as herein shown and described, and for the purpose set forth.

7. The combination, with the shaft K, provided with the springs L and cog-wheel M and the pinion C on the axle A, of an adjustable frame carrying intermediate gearing, substantially as herein shown and described, whereby provision is made for transmitting power from the cog-wheel to the pinion, or vice versa, as set forth.

8. The combination, with a velocipede, of the shaft K, the power-accumulating springs L, the cog-wheel M, the pinion C on the shaft A, and the pinions R S in the movable frame N, substantially as herein shown and described, and for the purpose set forth.

9. The combination, with a velocipede, of the shaft K, the power-accumulating springs L, the cog-wheel M, the pinion C on the shaft A, and the pinions R S in a frame, N, attached to an arm pivoted on the shaft K, substantially as herein shown and described, and for the purpose set forth.

10. The combination, with a velocipede, of the shaft K, the power-accumulating springs L, the cog-wheel M, the pinion C on the shaft A, the pinions R S in the adjustable frame N, and the guide-frame P, substantially as herein shown and described, and for the purpose set forth.

11. The combination, with a velocipede, of the shaft K, the power-accumulating springs L, the cog-wheel M, the pinion C on the shaft A, the pinions R S in the adjustable frame N, the guide-frame P, provided with notches *m*, and the sliding-handle Q, provided with lugs *o* at the lower end, substantially as herein shown and described, and for the purpose set forth.

12. The combination, with a velocipede, of the shaft K, the power-accumulating springs L, the pinion C, the pinions R S in the frame N, attached to the swinging-arm O, the spring-pawl T, and the rod *r*, pivoted to the arm O, substantially as herein shown and described, and for the purpose set forth.

13. In a velocipede, the combination, with the treadles E, the levers G, provided with studs *g*, the springs H, the rods J, and clutch-boxes J′ on the shaft A, of the link-pieces F, pivoted to the treadles E, and provided with longitudinal slots *e* and recesses *e′*, and with cam-projections *f*, substantially as herein shown and described, and for the purpose set forth.

SAMUEL N. SILVER.

Witnesses:
GEORGE C. WING,
E. T. GILE.